

Total No. of Questions : 8]

SEAT No. :

P4402

[Total No. of Pages : 2

**[5251]-1010**  
**First Year Engineering (II Semester)**  
**BASIC MECHANICAL ENGINEERING**  
**(2015 Pattern)**

*Time : 2 Hours]*

*[Max. Marks : 50*

*Instructions to the candidates :*

- 1) *Figures to the right indicate full marks.*
- 2) *Use of the electronic pocket calculator is permitted.*
- 3) *Use of cell phone is prohibited in the examination hall.*
- 4) *Neat diagrams must be drawn, wherever required.*
- 5) *Assume suitable data if necessary.*
- 6) *Attempt Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6 and Q.7 or Q.8.*

**Q1) a)** Explain construction and working of rigid flange coupling with neat sketch. **[6]**

b) Compare mechanism and machine (four points). Draw a sketch of any one device or machine. **[6]**

OR

**Q2) a)** Draw neat sketch of open belt drive with idler pulley and simple gear train. Explain the significance of idler pulley and idler gear respectively. **[6]**

b) Explain 2-3 engineering applications of cast iron, plain carbon steel, aluminium, copper, rubber and plastic. **[6]**

**Q3) a)** What is welding? Draw neat sketch of arc welding and brazing process setup. **[7]**

b) Identify and explain suitable manufacturing process to impact smooth surface finish & dimensional accuracy to balls and rollers of rolling contact bearings. **[6]**

OR

**Q4) a)** Differentiate between arc welding, brazing and soldering process(6 points) **[6]**

b) Explain drilling, reaming, boring, tapping operation performed on radial drilling machine. **[7]**

**P.T.O.**

- Q5)** a) What is thermodynamic system? Explain various types of thermodynamic systems with example. [4]
- b) Define atmospheric pressure. What is difference between gauge pressure and absolute pressure? Draw a sketch/diagram which represents relation between them. [4]
- c) A household refrigerator with COP of 1.8 removes heat from the refrigerated space at the rate of 90kJ/min. Determine
- Electrical power consumed by the refrigerator
  - The amount of heat rejected to kitchen. Define refrigerator and draw sketch of the system with the concept of heat source and heat sink. [5]

OR

- Q6)** a) State any two statements and discuss any two limitations of first law of thermodynamics. [4]
- b) Define the following : Heat pump and COP of heat pump, Refrigerator and COP of refrigerator [4]
- c) The pressure of gas flowing through a pipe is to be measured with simple U-tube mercury monometer. Left arm of the U-tube is connected to gas pipe while right arm is open to atmosphere. Calculate the absolute pressure of the gas when the level of mercury in the arm open to atmosphere is 300 mm higher than the level of mercury in left arm. Draw sketch of the barometer and manometer setup Given : Atmospheric pressure = 10 m of water column acceleration due to gravity =  $9.81 \text{ m/sec}^2$  density of mercury =  $13,600 \text{ kg/m}^3$  [5]

- Q7)** a) List various conventional and non-conventional energy resources? Draw block diagram of solar power plant. Explain energy extraction (transfer) in the plant. [6]
- b) Explain working of reciprocating pump with the help of sketch. [6]

OR

- Q8)** a) Explain working of window air conditioner with neat sketch. Why smoking is prohibited in the air conditioned room / office. [6]
- b) State function and application of boiler. How these are classified? [6]

